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THE

NATURAL ARSENICAL WATERS

OF

LA BOURBOULE.

*Notes with reference to their Therapeutic Value in
the Treatment of Diathetic Maladies and
Cachexias in General.*

BY

A. M. BROWN, M.D.

With an Introduction and Notes

By GUY CADOGAN ROTHERY.

LONDON :

THE SANITARY PUBLISHING COMPANY, LTD.,

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CONTENTS.

INTRODUCTION	7
ANALYTICAL NOTES	12
OPENING REMARKS	13
GENERAL THERAPEUTIC INDUCTIONS	15
THE LYMPHATIC AND SCROFULOUS DIATHESIS... ..	16
THE STRUMOUS DIATHESIS	20
THE ARTHRITIC DIATHESIS	23
THE HERPETIC DIATHESIS	26
THE SYPHILITIC DIATHESIS	28
CACHEXIAS IN GENERAL	30
CACHEXIAS IN GENERAL... ..	32
CONCLUSION	34
NOTES	35

THE
ARSENICAL WATERS OF LA BOURBOULE.

INTRODUCTION.

IN the district of Mont Dore, in the Department of the Puy-de-Dome, lies La Bourboule, noted for its thermal springs. What was until recent years a modest hamlet, is now a charming health resort. Its commodious sanatorium, situated on a gentle slope, some 2795 feet above sea level, commands a wide view of a lovely valley, through which the Dordogne river flows and is sheltered to the North, South, and West by hill and mountain ranges, varying in form and altitude. The air is pure and bracing, but not too rarefied; the temperature from June to October is pleasant, the rainfall moderate, while the soil is naturally well drained, resting, as it does, upon a trachytic tuff deposit which overlays the granite. Abounding in variety and interest, the surrounding country possesses every charm for the valetudinarian and the tourist. While the beauty of the scenery, sights of historic interest, and other local features of attraction for the usual outing or pic-nicing invite the invalid, the mountains, streams, and pine woods lie open to the enterprise of stronger subjects.

The chief attractions of La Bourboule, however, are its thermal mineral waters. Exceptional in their chemical and other qualities, these waters cannot properly be

classed with those of any other source. Rich in sodium, carbonates, and chlorides, they are remarkable for the amount of arsenic, in a highly-assimilable form, which they contain. In this respect they occupy a place apart. Those of Bou-Châter in Tunis alone surpasses them.

Centuries before the Christian era the Romans were acquainted with the luxury and curative properties of the natural thermal spring. Every country which they ruled bears witness of the fact, and to them we owe the priceless heritage of our bathing stations, La Bourboule, reputedly, being of the number. After the fall of the Empire, and throughout the Middle Ages, the tradition of the medicinal efficacy of its waters continued to survive. At all events, at a later date we hear of the sick and suffering visiting the "fever springs." About the beginning of the seventeenth century, however, a hospital was founded by the noble house of Turenne, and was much frequented, since which date it received from time to time the attention of the scientific, the waters being analysed and clinically tested; but it was not until 1853 that Thenard happily made known their arsenical properties.

The full chemical and therapeutic value of the springs were not, however, realised until MM. Choussy and Perrière came on the scene and undertook extensive boring explorations. Commencing operations close under the rocks, they pierced the trachytic tuff to the granite, and, finding a "fault" in the rock, tapped a prolific spring. The two wells, which are at

no great distance apart, clearly draw their supplies from the same subterranean reservoir, as the level of water is always identical in both wells.

An exceptional water such as the above cannot be employed indiscriminately. It is a therapeutic agent of a very active kind, and is found to vary in its action according as it is given externally or internally, or in both ways simultaneously. In its external application the action is mainly that of the bicarbonates and chlorides on the nervous system, not by absorption, but by stimulation of the peripheral nerves. As one might expect, external applications give the best result when administered at the Spa itself, for then the natural thermal character of the water and the action of the carbonic acid gas is fully felt, the skin and nervous system being more susceptible to the effects of the salines.* Therapeutically, there is but little difference between the bottled water and that drunk at the springs, though, of course, its thermal character is lost, and there is a slight modification as regards aëration. It is chiefly employed to combat anæmia, lymphatic conditions, early stages of pulmonary consumption, nervous debility, more especially when resulting from malnutrition, or the effects of malarial fevers, or obstruction of the liver.

Great care is observed at La Bourboule in bottling the waters of the Choussy-Perrière spring for transport. Owing to the complete solution of the insignificant per-

* See Note A.

centage of calcareous salts, and the comparatively small quantity of iron, the water bears transport admirably. It was with the bottled waters that Gubler, Bazin, Guéneau de Mussy and others experimented in Paris hospitals.

With the view to afford the greatest possible facilities to practitioners and their patients, the company maintain three establishments at La Bourboule, each supplied with water from the Choussy-Perrière spring. The waters are collected in tanks at some height above the bathing places, in order to give the necessary pressure for baths, spraying, &c., while the drinking fountains are supplied direct from the well. L'Etablissement des Thermes is a very fine building, elaborately planned and organised. It contains 80 private baths, besides plunge, shower, and variously-arranged spray baths, as well as appliances for local applications. There are also rooms for shower and vapour baths, massage, &c. The temperature of the water is adjusted by the admixture of cooler and less saline waters from the Fenestre springs. The drinking fountain is supplied with pure Choussy-Perrière water, and the same supply is found in the room set apart for throat and nasal spraying. There are appliances for every purpose, and great attention is paid to cleanliness. The Choussy Etablissement is also a handsome building, containing 53 baths, douches, vapour baths, &c. In this case the water for bathing purposes is supplied from a large tank, where it is allowed to stand some time, with the result that the peroxide of

iron is precipitated. In the Etablissement Malbru there are 29 baths, besides douches, &c. This subdivision of resources of the Spa enables the character of the external applications to be adjusted with the greatest nicety to suit particular cases. As a rule the temperature of baths is kept at 35 deg. C., and their duration is restricted to 30 minutes, but modifications are introduced according to circumstances. However, there is every facility for modifying treatment at any time, so that it can be tempered to the strength and condition of the patient.



ANALYTICAL NOTE.

When the arsenical waters of La Bourboule are referred to in current medical literature, it is those derived from the Choussy-Perrière springs that are meant; and to them belongs the unique character which we habitually associate with that Spa. In 1878, MM. Bouis and Lefort made an elaborate analysis of this and other sources belonging to the company. It has been found that the water preserves a wonderful uniformity, notwithstanding that the hourly flow is 23,310 litres. The temperature reaches 60 degrees Cent. The mineralisation per litre was found by the above-named experts to be—arsenate of soda, 0.02847 (equal to 7 milligrams of arsenic); free carbonic acid gas, 0.0518; chloride of sodium, 2.8406; chloride of potassium, 0.1623; chloride of lithium, traces; chloride of magnesium, 0.0320; bicarbonate of soda, 2.890; bicarbonate of lime, 0.1905; sulphate of soda, 0.2084; peroxide of iron, 0.0021; oxide of manganese, traces; silicic acid, 0.1200; aluminium, traces. The other springs being poorer in arsenates, their produce is not bottled, and only one is utilised to moderate the temperature of the water for bathing.

THE ARSENICAL WATERS OF LA BOURBOULE:

There is something which I do not pretend to explain, and certainly shall not speculate upon here, which distinguishes the action of natural mineral waters from the action of salts which are produced pharmaceutically.—
Sir HENRY THOMPSON, F.R.C.S., "Clinical Lectures,"
1871.

It is generally admitted that medicinal agents in the form of natural mineral waters prove, in many cases, much more certain in their action than those of artificial manufacture or their active principles pharmaceutically prepared.

Strongly impressed with the conviction that this applies to arsenical waters in particular, I am induced to think English practitioners inexcusable in overlooking them among the present means at their disposal in combating a numerous and most important class of maladies.

Arsenic is that agent which, through all the varying phases of therapeutic caprice, retains perhaps the highest claims to specificity. In prudent hands it answers admirably to the confidence reposed in it in the past, as also in the present; but so long as the statement made by Sir Henry Thompson in a clinical lecture, and which heads our study, is ignored, can we feel assured that its utmost potentialities have been realised?

For more than thirty years in France the subject has been receiving serious attention, and to an extent of which we in England seem little aware. The rapid

extension and success of the labours in this direction are worth considering, and it may be well to ask ourselves whether we may not have been professionally losers by in difference to such a medical auxiliary.

We need not be reminded how little relation there is between those elegant mineral table waters, which by dozens have come to be included in our list of beverages, and the arsenical waters, properly so-called, of La Bourboule. These require prudent professional prescription and care on the part of the patient in their use and occupying medicinally quite a different position, may be even made to substitute the ordinary medico-chemical preparations of our pharmacies, over which, according to authorities, by no means enthusiasts, they possess in some cases the double advantage of being safer and more certain in their action.

Of the best known mineral waters in which arsenic is detected, France, for the moment, possesses almost the entire monopoly. Mont Dore, Lamalou, Vals, Vichy, Plombière, and St. Nectaire are of the number, though classed as saline or alkaline. The traces of the mineral are, however, slight and insignificant in them. As for the source Choussy-Perrière at La Bourboule in the Auvergne, the same cannot be said. Though generally ranked with the above, from the fact of their being much more highly charged, they ought properly to constitute a family apart. In their therapeutic action an equal privilege may be awarded them; the soda arsenate contained being present in more appreciable medicinal quantities, it is to them that our notes will more particularly refer. It must be remembered that when we speak of La Bourboule, we refer to the waters of the Choussy-Perrière springs, those alone possessing

the high percentage of the arsenate and chloride of soda, and the small amount of iron. It is necessary to particularise thus, as there are several other mineral springs at La Bourboule, or in its neighbourhood, which are, however, practically non-arsenical.

I.

*General
Therapeutic
Inductions.*

THE value of a remedial agent is inferred from the nature of its chemical properties and physiological effects. In the case of a mineral water, this, as a basis of indication, is obviously of little weight. To get at facts, it is necessary to studiously note its effects in disease, it is clinical experience which alone enables us to pronounce decisively. If it is the duty of the medical directors of the thermal spas to carefully observe physiological action, it is for the general practitioner, disinterested, and entirely independent, to form the most reliable opinion as to its remedial efficacy. While accepting the scientific conclusions of the specialists, more is to be expected of the private physician, who, while defining and confirming immediate utility in given cases, is better situated for appreciating ulterior results.

At the arsenical spas, as at the mineral water stations generally, the treatment carried out has largely a diathetic aim in view. We are of those who hold that in France particularly there exists too great a tendency in the present day to see diathesis everywhere. Assuredly there are few diseases of which a certain duration do not produce a constitutional change in some way; still, it is

well to reserve the qualification of diathetic maladies to those in which the character is clearly defined, always the same, and of such a nature that a localisation does not recognise any other cause than the condition itself; that is, the diathesis which is nothing in reality, but a morbid predisposition resulting from a previous viciation of the tissues and humours.

We are not disposed to attach more importance to distinctions founded on diathesis than is justly warranted. When, however, one or other is clearly recognised it ought necessarily to be duly noted; we consequently feel it our duty in dealing with the subject to instance some of the most typical, and in which the efficacy of the arsenical waters—from the Choussy-Perrière springs at La Bourboule—have been fully tested.

II.

THE first in rank of the affections whose beneficial treatment has established the celebrity of arsenical waters, are those of the lymphatic and scrofulous diathesis.

The Lymphatic and Scrofulous Diathesis.

habits, closely allied, and which underlie and complicate so many other maladies. M. Rotureau, in a well-known article, sees them specially indicated in all the various forms, from simple lymphatic exaggeration to the most advanced strumous ulcerations and necrosis. The observations published some years ago by M. Peyronnel, disclose very remarkable results in these affections, and since extensively confirmed, leave little doubt of their highly curative virtues. MM. Bertrand and Mercier, who having long placed private patients

under hydro-thermal management, also amply testify to their remedial action.

We need not enter now into the question of why or by virtue of what principle these mineral waters act in the various morbid manifestations. It will be sufficient for the present to draw the attention of the profession to the acknowledged fact of their efficacy in their several modes of exhibition, and that no matter what may be the form or degree of intensity of the morbid conditions, be it irritative, ulcerative, or suppurative. Nor is this all the conscientiously convinced claim for them. It is to be added, and this is of great importance, that these waters display their curative action all the more markedly as the morbid accidents are constitutional and deeply seated. M. Bergeron in a lengthy and learned report, though with reference to a water system of quite another order, which we need not now analyse, strongly supports these conclusions; thus affording a testimony, at once confirmatory and explicit, of one most competent to judge. This distinguished Parisian physician, who has contributed more than any others to bring within the notice of the profession the superior claims of these waters, holds that their medicinal properties form one of the chief articles in his therapeutic faith. Professor Germain Sée has, with equal frankness, specialised their value; M. Grancher follows, with a host of others equally well known to the world and medical science.

It may be said that if such is the efficacy of these natural arsenical mineral waters, we have something approaching a specific. This is an exaggeration, but as many forms of disease are influenced and aggravated by lymphatic and scrofulous complications, the value is greater than might naturally be supposed. Nor is it to

confirmed*malady alone that waters address themselves ; they are also preventive or prophylactic in the sense that they arrest the predisposition, lymphatic tendency, and thus retard, if they do not definitely bar, the inflammatory hyperplasy which constitutes adenitic and strumous states. These medicinal properties ought consequently to place them in the leading rank of hygienic means indicated in the case of the scrofulous and lymphatic.

It is for this reason that La Bourboule, for instance, has become the station, *par excellence*, in the nutritive perversions of infancy. At that age, says M. Potain, there are comparatively few who do not share to some degree the lymphatic habit. In many, this tendency, once exaggerated, lays the foundation of that morbid condition usually known as the lymphatic; a stage further, and the scrofulous is attained. We may add that children support the thermal treatment as conveniently as they do arsenical medication in general, and for this reason M. Escot declares that these waters, such as La Bourboule, are called upon to play a part in the medication of the maladies of those of tender age, equal to that of cod liver oil, &c. &c. It does not follow, however, that in administration a careful professional attention can be dispensed with in the case of young subjects ; perhaps their resistance of the agent is exaggerated, in any case tolerance is the rule.

Before everything, then, we ought to seek in a given lesion the presence of diathetic evidence. We find it in the antecedent conditions of heredity, of misery, or of the medium which creates the predisposition. A congenital tendency to scrofula, it may be held, is not always hereditary ; a cachectic malady of parent or

parents independent of that taint may engender the predisposition in the offspring, just as insufficient suckling, premature weaning, bad nourishment, neglect and overcrowding, which determine the eclosion of scrofulous accidents, immediately an exciting cause, constitutional or local, arises to bring the morbid state into activity.

Such are M. Jaccoud's views, and we find them in the nature of the ailments themselves, when in many cases a diathetic origin may remain uncertain. It is scarcely necessary to enumerate eruptions, scald head, pseudotinia, glandular enlargements which accompany dentition, the scrofulous ulcerations which succeed them or appear inveterately in adult age; the indolent abscess, periostitis, white swellings, hydarthrosis, osteitis, caries, necrosis, otitis, blepharites, conjunctivites, and keratitis, visibly kept alive by the constitutional vice; finally, the various visceral depositions, pulmonary or mesenteric with their degenerative sequelæ. In that later period of scrofulous cachexia these waters will be serviceable and may even still be curative; at all events, they prolong life by diminishing suppurative discharges, which in exciting the physical forces exhausts them.

III.

The Strumous Diathesis. SCROFULA is a graft induced upon a lymphatic constitution. If the organic misery resulting from the scrofulous diathesis may be the cause or is associated

with tubercular deposition, that termination becomes of great importance. In the particular order of disease this morbid process presents us with, free use has been made of the arsenical waters.

On a point so delicate, it will be best not to refer to official spa experience. It will be more satisfactory to see what authorities less interested have to advance upon the question.

M. Guéneau de Mussy, for example, who devotes several pages of his *Clinique Medicale* to the subject of the La Bourboule waters in the treatment of pulmonary phthisis, results published some twenty years ago, and which have been amply extended and confirmed since, both by himself and others, may be quoted. It was with the waters supplied to him from the Choussy-Perriere spring that his experiments were made. After having detailed the mode of employment which he adopted, and which appeared to him the most suitable, the author makes the following observations illustrated with a list of the most striking and instructive cases.

“At the Hotel Dieu,” says he, “notwithstanding the unfavourable influence of bad arrangements and situation, the results obtained in many cases were very satisfactory ; not always, however, for it has happened at times that seeing no amelioration, I was obliged to suspend treatment. Constant success can no more be

secured from the administrations of these waters than from any other form of medication. Still satisfied so far, I should feel happy if farther experience confirm the conclusions to which the experiment seemed to lead, and if I have supplied an arm the more against a malady which so frequently defies our best effort, I should feel content."

"Since these remarks were published," again observes the learned clinician, "six years more of trial and observation have fully confirmed the hopes which suggested the first essays; the appeal which I then addressed to my fellow teachers and practitioners has been listened to, and the class of arsenical-bearing waters takes the place justly merited among our therapeutic measures."

Many of the celebrated clinical professor's observations will show how closely the investigation of their claims were carried ; they, in fact, supply an admirable guide to those desirous of testing their value as a basis or auxiliary in the treatment of consumption. For example :—

"In general, he remarks where morbid evolution is accompanied with phenomena highly accentuated—as in hectic fever, for instance — treatment, whether at the station, in hospital, or in private, should be interrupted."

Again: "These waters are appropriate to those cases so common where the pulmonary malady assumes an anæmic complexion, in which it would be dangerous to exhibit preparations of iron, or where chlorotic symptoms reveal themselves in the midst of a health disturbance of a first menstruation difficult and irregular.

"I should fear them much less than other waters in the case of patients who have hymoptisis, frequent and abundant. I dare not affirm, however, that they may

not, like all stimulants, sometimes favour a return of such accidents.

“The fixity of mineral principles makes them admirably adapted for transportation, consequently in the case of many anæmic and debilitated subjects, I have been enabled to largely test their remedial value. I am in the habit of alternating them during the winter months with cod-liver oil, with great advantage to my patients, young and old.

“Although in general I do not give, and do not consider it safe to give, a medicinal agent so active except in interrupted doses, I have seen patients who have continued their use for three months consecutively, and with advantage.”

Some patients, after a little time, experience dyspeptic symptoms, which oblige them to suspend the use of these waters. Sedoux advances the opinion that their action is more immediate, but less durable, in this class of disease than in some other forms. Those who confide in their efficacy, and prescribe them more frequently, such as M. Nicolas for example, protest against this view. But in upholding their exceptional properties, he and his school do not mean thereby to exclude the claims of the other usual modes of medical treatment. What they claim for them may safely be conceded to the extent that they are more powerfully resolute in certain cases, better adapted to dispose of chronic congestions, and more potent, especially against catarrhal elements, by acting more energetically on the nervous system.

In conclusion, without pre-judging here the distinction existing between scrofulous and tubercular processes, it may be said that more is to be expected in cases where decided signs of the strumous diathesis manifest them-

selves ; and as to ganglionic engorgements, should they exist, their presence rather gives promise of success than otherwise, that is, when the tendency to hyperplastic degeneracy is local rather than defined. In general the tendency to ulceration, when detected, ought rather to contraindicate a medication whose first effect is irritative and deteriorating, and which, in the case of an organ of such vascularity and delicacy as the lung, might be prejudicial, if not even dangerous. It is to this direction the opinion of Gubler must be interpreted. This zealous therapeutic investigator considers that form of medication exceedingly useful in moderating the symptomatic fever of pulmonary lesions ; according to him, these waters approach the best known alkaline waters so much vaunted. He believes them specially efficacious in subjects of lymphatic or strumous habit labouring under phthisis in its slower form.*

IV.

As to the Arthritic diathesis, in principle the arsenical waters are claimed to be remedial by virtue of their alkalinity.

The Arthritic Diathesis. In fact, it is estimated that rheumatic patients form nearly one-third of the *clientèle* of La Bourboule, where every form of the malady is treated with advantage, especially the muscular form. M. Bazin particularly recommends the station for those cases in which arthritis is associated with herpes and scrofula.

* See Note B.

This well-known physician, holding that subjects affected with arthritic psoriasis alone, or herpetic psoriasis complicated with arthropathies, rheumatismal or gouty, derive great benefit from the use of these waters.

For M. Guéneau de Mussy the arthritic diathesis is a direct indication of this form of medication, and this opinion he reiterates in the first volume of his *Clinique Medicale*. "The waters," says he, "which have the greatest reputation in neuralgic rheumatism, are the saline arsenical waters of which France for the present may be said to enjoy the monopoly, at least, of the richest and most active. Such are Lamalou, Plombière, Royat, and La Bourboule, which represents the highest note of that thermal gammut, and is very useful in chronic rheumatism. For a long time the efficacy of the La Bourboule springs have been acknowledged in strumous arthrities. This fact led me some fifteen years ago, to make use of them in a form of this affection regarded at the time as almost incurable, and the very happy results obtained induced me to vulgarise their use, which since then has been much extended, as they now take rank in the therapy of chronic rheumatism."

Apart from the manifestations of characteristic pain, by what do we recognise the indication of the La Bourboule waters in arthritic maladies? And to begin with, by what signs do we detect the arthritic habit? In the first place, by the presence of the pains themselves concurrently with the lesion, certain skin affections, for example, in appearance independent, to which the attention is directed. It is not that coincidence necessarily implies a relationship. The appearance of a skin affection in those suffering from rheumatism does not prove a dependent affinity. It is, however, an indi-

cation of great value in this sense, that the arthritic habit or predisposition too commonly determines cutaneous manifestations which yield to measures appropriate to the diathesis. From the diagnosis of this constitutional habit may also be drawn notions of an associative or historic kind, hereditary affiliation, the frequency of indolent maladies, a knowledge of antecedent arthritic attacks, recurrence of pains vaguely localised, all indicating the cause; in fine, by the multiplicity of accidents of a similar nature pointing to the origin sought for and determined to the exclusion of other diathesis.

It is necessary also to take into account the scrofulous tendencies, if it is true, as Charcot holds, that scrofula is a common basis on which rheumatismal arthritis frequently develops itself.

As to the rheumatism itself, the form is not indifferent. According to Guéneau de Mussy, these waters are most suitable in the decidedly chronic form, where reactional phenomena are absent or triflingly accentuated, and nervous excitability moderate. It will be necessary, adds he, in tracing the limits of these indications, to prepare patients for a temporary aggravation of their sufferings, symptoms which are so liable to manifest themselves, and in so many modes, in the course of treatment, but which are of short duration. As to localisation and complication, then, it is the articular and cutaneous varieties to which the treatment corresponds most frankly.

Now, with reference to contra indications—for they exist — Charcot, for example, declares the arsenical medication without effect, if not injurious, in moderate cases of rheumatism of a neuralgic character, as also those in which the malady has declared itself at advanced age. In testifying to cardiac affections which in

this connection would appear to render their use carried to the extent of bathing hazardous or inapplicable, M. Noir states he prescribed even baths and douches without observing the slightest inconvenience ; rather the contrary, as all accidents seem to cease in proportion as the rheumatic symptoms were relieved. Testimony of this nature is satisfactory. But in order that error be guarded against, it would be well for the medical directors of the spas to define contra indications more precisely.*

V.

*The
Herpetic
Diathesis.*

WE are of those who think that the herpetic diathesis is mere illusion, and that Hebra has done well to rid dermatology of it altogether.

For some this systematic rejection is carrying the question too far; but what is the morbid disposition in which it is supposed to exist? In those affected, the nerve tissue and organic elements appear to be sound, the existence of the diathesis resting on no facts of positive observation. It is admitted simply by induction or hypothesis.

For us these diathetic evidences may find themselves sufficiently explained by dystopias or malformations of the skin, having their departure in some vice of evolution still unknown of the nervous system. The symmetrical mode of distribution may explain itself through the medium of the nerves. Clifford Allbutt, in writing of the

* See Note C.

influence of the nervous system, and of the influence of arsenic upon the nutrition of the skin, insists upon the intimate relations which exist between cutaneous diseases and certain nervous perturbations confirmatory of these views.

M. Lestut sees in their evolution, form, and distribution some abnormal function derangement, central or peripheral, pertaining to the nervous system. Speculation has even been carried further, but in any case we are disposed to believe that this class of affections ought to be regarded as almost exclusively cutaneous. We are so much the more interested in insisting on this point from the fact that several authors recommend strongly the use of natural arsenical waters in the treatment of skin affections, awarding to them a cure monopoly. Without being so exclusive as M. Bazin in considering them a specific for herpetic eczema, or that they are, according to M. Hardy, the most powerful of medical agents in combatting the various manifestations of the dartrous and particularly the eczematous habit, it may be held that arsenic in this or other forms holds, in some sort, a monopoly of the cure of these maladies. It may be said that it is it which addresses itself in the most direct manner to the morbid action of diathetic principle, or the external or integumentary surfaces, without, however, possessing the power of extinguishing it or expelling it radically from the economy.

Therefore, for those who admit with us, that dartrous affections are not diathetic, but purely cutaneous, it ought to be concluded, as shown by the attestations of eminent clinical authorities and extensive experiment, that arsenic in this form is the medicinal agent *par excellence* in diseases of the skin, and its use will more readily be

adopted in all those cases in which the nature of the diathesis escapes investigation, or, as M. Bazin says, where the diagnosis remains undecided or uncertain.

VI.

BOTH at the spas and in general practice the arsenical water treatment has naturally attracted a contingent of patients of the syphilitic diathetic class.

The Syphilitic Diathesis.

The opinion of those practitioners who have seriously tested its efficacy seem very unanimous as to its great utility, at least in the tertiary forms. It is in this respect that many authorities uphold it. Its administration, one of them, however, remarks, is not ordinarily applicable except in the tertiary stage of the malady. After mercury or iodide of potassium, the arsenic sometimes comes in admirably in aiding us to finally dispose of the enemy. And, to judge from analogy, this is precisely what we might expect. In this stage we have the type of diathetic affections; the disease has reached that point when, stripped of all the attributes of virulence, it is fixedly constitutional; to the transient and superficial changes of the secondary affection have succeeded lesions which do not spare the internal organs any more than the integument. It is no more simple hyperæmias with or without exudation, inflammations, slight and of short duration, but profound alterations, essentially slow in the evolution. Glandular mischief is still present, but instead of the superficial it is the deep-seated, and particularly the visceral glands that are implicated; for above all that is the visceral period of the malady, with

its varied category of melancholy manifestations, such as chloro-anæmia, anæmic-cachexias, marasmus, and the like.

The utility of these waters, however, should not be altogether overlooked in even the second stage. Here they are often found to give excellent proofs of decided action on the skin especially. It is in those conditions which have resisted previously the ordinary anti-syphilitic agents that these waters display their curative properties more markedly.

The summary nature of our notes does not admit of fuller observation which would involve delicate and controverted points. This is to be regretted ; syphilis, in whatever manner it affects the system, is the best guide for the study of the maladies in question in connection with these therapeutic measures. In the secondary stage the use of arsenical treatment, either by ordinary preparation or natural mineral waters, has not yet been duly estimated. In the tertiary much more may be said, as this has long since passed beyond experiment.

In the infantile form of syphilis, their use is still more promising. As to the hereditary and congenital diathesis of the newly-born infant, subjects of this class are, from the first, under the influence of cachectic conditions from which adults suffer much more rarely and less gravely. These points, however, we can only allude to. Like the paludal diathesis, with all its train of dyscrasias still more clearly marked, they will be covered by farther remarks on action of the water on the cachexia in general.

VII.

DIATHETIC maladies, particularly those
Cachexias we have already referred to, after a long
in duration inevitably lead to deterioration
General. of the blood and other circulating fluids
 in consequence of certain organic morbid alterations
 gradually induced.

In the present day it is generally admitted that the formation and maintenance of the blood are functions performed by the co-operation of certain organs. Pathology, better even than physiology, proves the hæmopoetic agency of these organs. We know, for example, that chronic affections of the liver and spleen produce serious consequences as regards the quantity, quality, and composition of the blood; for whatever be the nature of these affections, they are followed by modifications in number, consistence, form, colour, and chemical constitution of the globules. Now, in the class of maladies we are considering, the origin of this tendency, irrespective of the structure implicated, may be traced to some morbid habit or disposition, be it hereditary, congenital, or acquired.

Now, how is the action of arsenical waters under such special conditions to be explained? Somewhat as we endeavour to explain that of the pharmaceutic agent.* Let us look more closely into the pathological conditions, dyscrasias, anæmia, chlorosis, &c., incidental to diathetic conditions.

It is now generally admitted that anæmia and chlorosis

* See Note D.

cannot be regarded as the same diseases. Though often seen together or combined in the same subject, it by no means follows that the anæmic are chlorotic or the chlorotic anæmic. If at source anæmia arises from a defect of blood constituents, chlorosis is a neurosis, and though often allied to the former, is rather the cause than the effect. It is to be feared in practice, the undue disregard paid to these facts has led to much confusion, and a too generalised specific mode of treatment ; it is iron, iron in every form and everywhere. Trousseau has most pointedly exposed this error. The influence of ferruginous preparations on chlorotic subjects he maintains to be a matter of serious consideration, and insists that though, when prudently exhibited, they are generally well tolerated, should the object not be quickly gained, they ought not to be continued. In certain hereditary predisposition care must be taken not to push such an agent as iron too far, no matter how seductive the form of preparation, as from its power of functional stimulation it may awaken gravest complications, which might otherwise have remained dormant. Perhaps we ought to consider the use of iron with reference to these states much as we do mercury in syphilis or quinine in intermittents, valuable for enabling us to restore the normal state of things ; and, be it observed, not because they furnish the economy with this or that constituent, metallic or alkaline, but rather because by affecting certain organs, they enable them to accomplish functions by virtue of which they assimilate those elements which food contains, as in the plenitude of health.

In these obscure and indefinable pathological conditions characteristic of cachexias, whether diathetic or accidental in their nature, "I have obtained," says

M. Trousseau, "under the influence of bitters, arsenic, and sea bathing, equally favourable results in those patients so affected, and escaped producing the general excitement, the prelude or cause of, for instance, hypomotises in tuberculosis, and I am consequently constrained to impute to iron some of the worst effects which I have had to deplore."

What stronger proof is necessary of the folly of the excessive confidence in iron, and its manifold preparations, which medical routine of the day has vulgarised, or what higher testimony could be desired of the utility of arsenic when judiciously exhibited in this extensive field of human suffering? There is none I know of.

VIII.

It is, therefore, in the cachexias this agent proves most reliable. It is in those deteriorations of the circulating fluids, whether proceeding from nervous causes — as in certain skin affections or chlorosis — or perversions accompanying or consequent on diathetic maladies, singly or combined, that arsenic shows best its virtues, tonic and restorative. Even by those of anti-arsenical prejudices, this will not be denied, at least as regards the mineral water form, and with no sacrifice of their medico-chemical ideas. On this point their convictions may be fully satisfied, as the chloride of sodium and other associated salts, to which some would award the merit, are always certain to be present. However, in the opinion of those best entitled to decide, the arsenate, so far from giving place to other salts, thera-

peutically dominates. Doubtless the arsenate alone is not a direct sthenoplastic, and the blood has nothing to demand of it, as in the case of iron and the chlorides. But, not to carry our consideration further, the essence of the action in these morbid conditions would appear to be in the case of the waters under consideration, a matter of dose and also the method of administration, little else. Hot baths of Choussy - Perrière waters increase nutrition and accelerate the action of the secretory organs, and may be classed as stimulative.* Taken internally, the arsenate moderates nutritive activity, minimising waste, especially of the phosphoric elements, lessening the secretion of urine, while profoundly influencing the character of the blood, the density of the serum being increased and the coagulation of fibrine diminished. But many clinicians have observed a marked difference of action according to the dose given. As applied to the waters of La Bourboule, I fully accept these facts, and maintain that it is owing to their complex action that we are indebted for their safety and success in practice.

If the interpretation leaves anything to desire, the facts at least are beyond dispute. Without entering more minutely into the subject, I would briefly recapitulate. Arsenic is better than iron in the paludal cachexias and neuralgias which are so frequently the consequence of chlorosis, lymphatic chlorosis, particularly in its infantile forms, as also in those anæmias which accompany the chronic form of arthritis, and arthritic dyscrasias. For the diabetic cachexias, there is much to be said in favour of using these waters, on condition

* See Note E.

that certain complications do not present objections to their employment. In fine, my opinion is that in all such cases enumerated there need be no hesitation in advising, in a general manner, their use. They may even be extended to convalescents, the delicate, the debilitated, and those constitutionally or organically depraved, who with difficulty lingeringly undergo their normal development. In diathetic conditions, as well as cachexias, these waters will be found suitable.*

To enlarge farther on this subject
Conclusion. seems almost unnecessary. We have already alluded to the opinion of M. Rotureau, who, in speaking of the curative action of the La Bourboule waters, holds that they are all the more remarkable as the maladies are deeper seated, constitutional, and for that reason graver in their nature. As for M. A. Nicolas, he places them in the first rank ; they are for him the waters *par excellence* in the case of the diathetic, cachectic, delicate, convalescent, and valetudinarian. Relying upon the experience of those less interested, and as fully competent to judge, this claim is well established.

* See Note F.

NOTES.

NOTE A.—Baths have a slightly stimulating effect on the digestive system, and undoubtedly assist nutrition, though minimising nerve waste. They favour renal action, the flow of urine and the drainage of urate waste is increased. When taken internally, the waters are readily assimilated, inducing changes in nutrition involving an economy of a vito-chemical kind. Herein lies the chief merits of these arsenical waters for certain classes of diabetic and tubercular subjects, those suffering from anæmia, caries, necrosis, &c. Their wondrous tonic effect is seen when administered to patients the victims of nervous prostration following on low and malarial fevers. Uniform success seems to have followed the treatment of French soldiers and sailors invalided home from malarious districts of Algeria, Tunis, Cochin China, and Madagascar. Arsenic has now for some time been generally prescribed for such fevers; but with the natural mineral waters the dosage is given in a form which is far more to be relied upon than any pharmaceutical preparation.

NOTE B.—Consumptives often show a marked improvement after a short stay at La Bourboule. They increase in weight, expectoration diminishes, breathing becomes easier, while the blood constituents are decidedly enriched. That these results are due to the arsenate and chloride of sodium is established by the fact that such

amelioration is obtained not only at the Springs where much might be attributed to climatic influences, but in fact wherever the genuine article is used. During convalescence from pulmonary troubles, practitioners find an invaluable aid in these waters, which have also given excellent results in dealing with influenza, and even with chronic bronchitis, pulmonary catarrh, and hay fever. While evidently exciting a specific action on the parts affected, they give a fillip to the system generally. In the throat and laryngeal troubles of singers and orators it is found necessary to administer the waters internally, and also in the form of fine spray locally applied. Such cases seem to be greatly benefited by treatment at the Springs. Dr. Monin attributes his success with the large number of singers, professors, and clergymen who visit the place, to the natural thermal character of the water; possibly its highly gaseous quality also in some way contributes to that end.

NOTE C.—The prophylactic value of La Bourboule as a pleasant retreat for children or adults of enfeebled constitution (congenital or acquired) is very generally recognised on the continent of Europe. But with such a powerful agent as the waters of the Choussy-Perrière springs, certain precautions are absolutely necessary. The administration of the waters is contra-indicated in advanced stages of phthisis, in all inflammatory diseases, active feverish conditions; as also albuminuric and hepatic cachexias, more particularly when cardio-pulmonary or cerebral complications in well-defined forms are present. To these must be added the dyspepsias with a tendency to gastric ulceration, and neurotic and hepatic affections of an inflammatory nature; generally

speaking, such cases should be excluded from the thermal treatment.

NOTE D.—Very considerable success has resulted from the treatment of diabetic patients at La Bourboule. Under the combined influence of the arsenates, the sodium potassium, lithium, chlorides, and the carbonic acid, the aggravated symptoms of the malady often give way. Of course, a strongly alkaline water must always remain as the typical one for hepatic and arthritic forms of diabetes, but when there is fatty degeneration of the kidney this chlorinated arsenical water seems specially designated. Both the chemical nature of the water and its thermal character contribute to the combustion of the excess of glucose and its transformation into water and carbonic acid gas. Consequently, in cases where the health has been profoundly disturbed by the severer stages of diabetes, these waters may be tried.

NOTE E.—Dr. Landrieux has shown that the waters of the Choussy-Perrière spring alleviate nausea and suppress vomiting. They, indeed, seem to act as a tonic all along the digestive track, and for this reason give very good results with patients affected with sluggish abdominal circulation. When dyspepsia takes a diathetic form, according to Dr. E. Monin, the waters of La Bourboule are decidedly efficacious. It is worthy of note that these arsenical waters are effective in getting rid of most descriptions of intestinal worms.

NOTE F.—Further evidence of the action of the Choussy-Perrière waters in deep-seated affections is afforded by their action in female diseases. Fibroid and cellular growths of the pelvic and peritoneal regions often improve, and even quietly disappear, under the

influence of these thermal baths, and the injection of these waters. No doubt this is largely due to the thermal character of the spring, and the richness of its alkaline constituents, but to the arsenate is chiefly due the tonic action, as is shown by the healthier condition of the blood, and the improved nutrition of those who have submitted to a careful course of treatment.





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P

6